

Remarks

Entry of the above-noted amendments, reconsideration of the application, and allowance of all claims pending are respectfully requested. By this amendment, claims 1, 5, 8, 9, 11, 18, 20, 24, and 25 are amended, claim 19 is canceled, and claim 26 is added. These amendments to the claims constitute a bona fide attempt by applicant to advance prosecution of the application and obtain allowance of certain claims, and are in no way meant to acquiesce to the substance of the rejections. Support for the amendments can be found throughout the specification, claims, and figures (e.g., FIGS. 1-2), and thus, no new matter has been added. Claims 1-18 and 20-26 are pending.

Claim Objections

Claim 11 was objected to because of alleged informalities. Applicant has amended claims 5, 8, 9, and 11 to recite "first optical component" instead of "optical component".

Withdrawal of the objection is respectfully requested.

Claim Rejections - 35 U.S.C. § 103

Claims 1-25 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Vengsarkar (U.S. Patent No. 5,430,817) in view of Orthonos et al. (Artech House, Inc., 1999; "Orthonos") and in further view of Huang et al. (U.S. Patent No. 5,231,465; "Huang") and Michal et al. (U.S. Patent No. 6,108,086; "Michal"), and further in view of Ales et al. (U.S. Patent No. 6,507,429; "Ales"). This rejection is respectfully, but most strenuously, traversed.

Applicant respectfully submits that the Office Action's citations to the applied references, with or without modification or combination, assuming, *arguendo*, that the modification or combination of the Office Action's citations to the applied references is proper, do not teach or

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suggest the light source and the amplification fiber that are arranged in the forward pumped broadband fiber source configuration without the optical multiplexer between the light source and the amplification fiber, as recited in applicant's independent claim 1.

Examples of optical multiplexers and couplers are found throughout the prior art of record where they are used for coupling at least two fiber inputs into a single output line.

Michal et al. (U.S. Patent No. 6,025,915) discloses:

This configuration uses a pump light source 102, such as a pump laser diode, that emits light at a given wavelength which is directed through a wavelength division multiplexer (WDM) 104 that has two input leads and two output leads. (column 1, lines 21-24; FIG. 1)

A WDM coupler 210 has optical pigtails 212-215 extending therefrom. The pigtail 212 is connected to optical fiber 208 via a splice 216, so that the pump light propagates from the pump light source 206 to the WDM coupler 210. The WDM coupler 210 guides the pump light into a gain fiber 218 that is connected end-to-end with the optical fiber pigtail 215 via a splice 220. (column 4, lines 16-23; FIG. 5)

Michal et al. (U.S. Patent No. 6,108,086) discloses:

In the fiber optic gyro 204, the optical signal propagates to a fiber optic coupler 208, such as a 2x2 multiplexer (MUX). (column 5, lines 38-40; FIG. 4)

The fiber optic leg 216 is connected to a 1xN coupler 226 which splits the light into N different fiber elements 228. (column 6, lines 12-14; FIG. 4)

Huang et al. (U.S. Patent No. 5,231,465) discloses:

Light input to the optical fiber 24 propagates to a multiplexer optical coupler 26, which is preferably an evanescent field optical coupler. (column 3, lines 47-49; FIG. 1)

After exiting the polarizer 30, the signal input then passes through a coupler pigtail fiber 31, which guides the signal to a second fiber optic coupler 32. The coupler 32 may be formed to be substantially identical to the multiplexer coupler 26. (column 4, lines 1-5; FIG. 1)

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A coupler pigtail fiber 60 is spliced to the absorbing fiber 58 to guide the light optical signal to a multiplexer coupler 62. The output of the multiplexer coupler 62 is input to a waveguide 68 formed on a multifunction integrated optic chip 70. (column 7, lines 37-40; FIG. 5)

Ales et al. (U.S. Patent No. 6,507,429) discloses:

Numerals 17 and 18 refer to conventional couplers, 19 refers to an optical isolator, and arrow 20 indicated the downstream direction. (column 2, lines 58-60; FIG. 1)

The SFS light is transmitted through fiber 320 to coupler 33, where it is split into two arms. (column 4, lines 3-5; FIG. 3)

Zanoni, et al. (U.S. Patent No. 5,768,012) discloses:

In the present invention, the Er/Yb fiber amplifier 12 is pumped by coupling optical energy from Yb cladding pumped fiber lasers 18a and 18b into the amplifier fiber core 12 with WDM couplers 16a and 16b. (column 3, lines 22-27; FIG. 1)

In one embodiment, these optical attenuators, respectively, are narrow-band WDM coupler 22a and narrow-band WDM coupler 22b. Couplers 22a and 22b are conventional couplers which couple wavelengths within a predetermined wavelength range. Couplers 22a, 22b are each configured to couple wavelengths in the range of 1080 nm to 1100 nm. (column 4, lines 27-33; FIG. 1)

Sorin, et al. (U.S. Patent No. 6,631,224) discloses:

The ASE signal leaked out of the second WDM coupler was monitored and the signals obtained when the filter was on and off were compared to yield the filter response. (column 15, lines 53-56; FIG. 21a)

Ghera, et al. (U.S. Patent No. 6,611,641) discloses:

Signals 130 and 132 exiting first section 120 are then separated by a second pump/signal coupler 140. Amplified output signals 130 are introduced into, and attenuated by a VOA 150, and are coupled by a third pump/signal coupler 160 into a second EDF gain section 170, along with residual pump signal 132 that bypasses the VOA through a bypass line 146. (column 5, lines 6-12; FIG. 1)

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Applicant respectfully submits that the applied references and other prior art references of record do not teach or suggest a light source and an amplification fiber that are arranged in the forward pumped broadband fiber source configuration without the optical multiplexer between the light source and the amplification fiber, as recited in applicant's independent claim 1.

Referring to Vengsarkar, applicant notes that the presence of an optical multiplexer is inherent in the design shown in FIG. 7, where a first path from the transmitter source 51 is coupled with a second path from the pump source 56 and combined into a single path for transmission to the erbium-doped fiber amplifier 54. Vengsarkar fails to disclose the light source and the amplification fiber that are arranged in the forward pumped broadband fiber source configuration without the optical multiplexer between the light source and the amplification fiber.

Orthonos discloses long period Bragg gratings, but fails to disclose the light source and the amplification fiber that are arranged in the forward pumped broadband fiber source configuration without the optical multiplexer between the light source and the amplification fiber.

Michal discloses a fiber optic coupler:

In the fiber optic gyro 204, the optical signal propagates to a fiber optic coupler 208, such as a 2x2 multiplexer (MUX). (column 5, lines 38-40; FIG. 4)

The fiber optic leg 216 is connected to a 1xN coupler 226 which splits the light into N different fiber elements 228. (column 6, lines 12-14; FIG. 4)

Huang discloses a multiplexer optical coupler and an optical coupler:

Light input to the optical fiber 24 propagates to a multiplexer optical coupler 26, which is preferably an evanescent field optical coupler. (column 3, lines 47-49; FIG. 1)

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After exiting the polarizer 30, the signal input then passes through a coupler pigtail fiber 31, which guides the signal to a second fiber optic coupler 32. The coupler 32 may be formed to be substantially identical to the multiplexer coupler 26. (column 4, lines 1-5; FIG. 1)

A coupler pigtail fiber 60 is spliced to the absorbing fiber 58 to guide the light optical signal to a multiplexer coupler 62. The output of the multiplexer coupler 62 is input to a waveguide 68 formed on a multifunction integrated optic chip 70. (column 7, lines 37-40; FIG. 5)

Ales discloses conventional couplers:

Numerals 17 and 18 refer to conventional couplers, 19 refers to an optical isolator, and arrow 20 indicated the downstream direction. (column 2, lines 58-60; FIG. 1)

The SFS light is transmitted through fiber 320 to coupler 33, where it is split into two arms. (column 4, lines 3-5; FIG. 3)

Accordingly, Vengsarkar, Orthonos, Michal, Huang, and Ales fail to disclose the light source and the amplification fiber that are arranged in the forward pumped broadband fiber source configuration without the optical multiplexer between the light source and the amplification fiber, as recited in applicant's independent claim 1.

For all the reasons presented above with reference to claim 1, claim 20 is believed neither anticipated nor obvious over the art of record. The corresponding dependent claims are believed allowable for the same reasons as independent claims 1 and 20, as well as for their own additional characterizations.

For example, applicant's dependent claim 24 recites:

wherein the light source is optically coupled directly to the long period Bragg grating via the first optical splice;

wherein the long period Bragg grating is optically coupled directly to the amplification fiber via the second optical splice;

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wherein the forward pumped broadband fiber source configuration comprises only the light source, the long period Bragg grating, and the amplification fiber.

Applicant respectfully submits that the cited references do not teach or suggest the light source that is optically coupled directly to the long period Bragg grating where the long period Bragg grating is optically coupled directly to the amplification fiber. In addition, the cited references do not teach or suggest the forward pumped broadband fiber source configuration that comprises only the light source, the long period Bragg grating, and the amplification fiber.

In addition, applicant's dependent claim 25 recites:

wherein the light source is optically coupled directly to the first long period Bragg grating via the first fusion splice;

wherein the first long period Bragg grating is optically coupled directly to the amplification fiber via the second fusion splice;

wherein the amplification fiber is optically coupled directly to the second long period Bragg grating via the third fusion splice;

wherein the forward pumped broadband fiber source configuration comprises only the light source, the first long period Bragg grating, the amplification fiber, and the second long period Bragg grating.

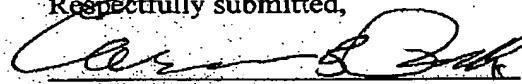
Applicant respectfully submits that the cited references do not teach or suggest the light source that is optically coupled directly to the first long period Bragg grating via the first fusion splice and the first long period Bragg grating that is optically coupled directly to the amplification fiber via the second fusion splice, and the amplification fiber is optically coupled directly to the second long period Bragg grating via the third fusion splice. In addition, the cited references do not teach or suggest the forward pumped broadband fiber source configuration that comprises only the light source, the first long period Bragg grating, the amplification fiber, and the second long period Bragg grating.

Withdrawal of the § 103 rejections is therefore respectfully requested.

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In view of the above amendments and remarks, allowance of all claims pending is respectfully requested. If a telephone conference would be of assistance in advancing the prosecution of this application, the Examiner is invited to call applicant's attorney.

Respectfully submitted,



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